Name:

at1124exam: Radicals and Squares (v920)

Question 1

Simplify the radical expressions.

$\sqrt{63}$ $\sqrt{45}$ $\sqrt{44}$

$\sqrt{3 \cdot 3 \cdot 7}$ $\sqrt{3 \cdot 3 \cdot 5}$ $\sqrt{2 \cdot 2 \cdot 11}$

$3\sqrt{7}$ $3\sqrt{5}$ $2\sqrt{11}$

Question 2

Find all solutions to the equation below:

$$\frac{(x+7)^2}{4} + 10 = 35$$

First, subtract 10 from both sides.

$$\frac{(x+7)^2}{4} = 25$$

Then, multiply both sides by 4.

$$(x+7)^2 = 100$$

Undo the squaring. Remember the plus-minus symbol.

$$x + 7 = \pm 10$$

Subtract 7 from both sides.

$$x = -7 \pm 10$$

So the two solutions are $x = 3$ and $x = -17$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 - 16x = 80$$

$$x^2 - 16x + 64 = 80 + 64$$
$$x^2 - 16x + 64 = 144$$
$$(x - 8)^2 = 144$$
$$x - 8 = \pm 12$$
$$x = 8 \pm 12$$
$$x = 20 \quad \text{or} \quad x = -4$$

Question 4

Any quadratic function, with vertex at (h, k), can be expressed in vertex form:

$$y = a(x - h)^2 + k$$

A quadratic function is shown below in standard form.

$$y = 2x^2 + 28x + 93$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 2 .

$$y = 2(x^2 + 14x) + 93$$

We want a perfect square. Halve 14 and square the result to get 49 . Add and subtract that value inside the parentheses.

$$y = 2(x^2 + 14x + 49 - 49) + 93$$

Factor the perfect-square trinomial.

$$y = 2((x + 7)^2 - 49) + 93$$

Distribute the 2.

$$y = 2(x + 7)^2 - 98 + 93$$

Combine the constants to get **vertex form**:

$$y = 2(x + 7)^2 - 5$$

The vertex is at point $(-7, -5)$.